NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2010

NAUTICAL SCIENCE: PAPER II

Time: 3 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 4 pages. Please check that your question paper is complete.
2. Answer **ALL** the questions in Sections A, B and C.
3. Begin the answer to each new question on a new page.
4. The use of scientific calculators is permitted.
5. Alphanumeric calculators and dictionaries are NOT permitted.
6. Nautical tables may be used.

REQUIREMENTS

Drawing instruments
Radar Plotting Sheet

ANNEXURES

1. NIL

SECTION A SEAMANSHIP

QUESTION 1

The following vessels, making way, are in clear weather and in close proximity to each other (so as to involve possible risk of collision):

- A tug and tow heading north;
- A tanker overtaking the tug and tow (heading north);
- A trawler (engaged in trawling) crossing heading east.

1.1 What is the responsibility of each of the vessels so as to comply with the International Regulations for Preventing Collisions at Sea 1972 (as amended)? (10)

1.2 What should each of the vessels mentioned in the question above sound in fog (restricted visibility)? (3 × 2 = 6)

1.3 Draw the lights displayed by a laden tanker underway in a restricted sea area viewed from …

1.3.1 ahead (3)
1.3.2 astern (3)

(The tanker is displaying its additional lights for a vessel constrained by its draught).

1.4 What are the four manoeuvring signals of a power driven vessel in clear visibility? Define the meaning of each signal. (8)

[30]

QUESTION 2

List ten action points to be taken on board a ship when a crew member falls overboard whilst at sea underway during the daytime.

[10]

QUESTION 3

3.1 Sketch a vessel in cross section showing it with a starboard heel …

3.1.1 stable (+GM).
3.1.2 unstable (-GM).
3.1.3 neutral equilibrium (ØGM).

Show the keel position, centre of buoyancy, centre of gravity and metacentre of the vessel in each of the sketches above. (3 × 5 = 15)

3.2 What makes a ship 'heel' to starboard? (1)

3.3 What makes a ship 'list' to port? (1)

3.4 Define 'Gross Tonnage'. (3)

[20]

QUESTION 4

Your vessel is steering a course 075º (T) and at a reduced speed of 10 knots due to poor visibility of less than 1 000 m. You detect a Radar target astern which you have been plotting with the following bearings and ranges:

Time	Bearing	Range
20:00	255° (T)	10,0 M
20:06	255° (T)	8,0 M
20:12	255° (T)	6,0 M

4.1 Plot the target's movements on the plotting sheet provided. (5)

4.2 Prepare a full target report. (10)

4.3 At 20:18 the same target is bearing 255º x 4,0 miles. What action would you take? (5)
[20]

QUESTION 5

5.1 What are the design features of a Ro-Ro ship? (5)

5.2 What is a Reefer vessel? (5)
[10]

90 marks

SECTION B COMMUNICATIONS AND METEOROLOGY

QUESTION 6

6.1 In the GMDSS what is Sea Area A1? (3)

6.2 Describe the signal you would transmit if your vessel named *Astor* with call sign ZSAR was in distress having grounded on the North-West side of Dassen Island. You are requiring immediate assistance. The weather conditions are wind NW Force 7 and poor visibility. (12)
[15]

QUESTION 7

Sketch the following isobaric pressure systems and illustrate on each one the isobaric pressure for each gradient and the wind direction for the Southern Hemisphere:

7.1 A Depression (5)

7.2 An Anticyclone (5)

7.3 A High Pressure Ridge (5)

7.4 A Low Pressure Trough (5)
[20]

35 marks

SECTION C SAILINGS

QUESTION 8

A vessel on a voyage from Cape Town to the Caribbean calculates Noon position on 13 February to be at Lat 31º 06' S Long. 013º 35' E. Ship's time is GMT + 1.
The next WP is Lat. 18º 55' N Long. 063º 25' W (GMT – 4).

8.1 Calculate the course to steer to the WP. (10)

8.2 Calculate the distance to go to the WP. (10)

8.3 What is the ETA at the WP at 18 knots? (5)
[25]

25 marks

Lat. 31º 06'	Meridional Parts	1952.93
Lat. 18º 55'	Meridional Parts	1148.62

Total: 150 marks